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DEVICE FOR AUTOMATICALLY DOWNLOADING CONTROL SOFTWARE INTO A PORTABLE TELEPHONE

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(56) Prior Art Documents
US 4791661
US 5268928

(57) **The portable data communication terminal of claim 1 from a reading of the specification as a whole is taken to be a portable or mobile telephone**

Claim

1. Device for automatically downloading control software of a portable data communication terminal including:

a control unit,

a modem connected between said control unit and a telephone line, said telephone line being adapted to be connected to a central station so that said control unit receives via said modem the latest version of said control software of said portable terminal,

a reference memory connected to said control unit to store automatically the latest version of said control software,

an interface for connecting said portable terminal and automatically downloading said latest version of said control software from said reference memory into a memory of said terminal.

CONVENTION

AUSTRALIA

Patents Act 1990

REQUEST FOR A STANDARD PATENT

AND NOTICE OF ENTITLEMENT

The Applicant identified below requests the grant of a patent to the nominated person identified below for an invention described in the accompanying standard complete patent specification.

[70,71]Applicant and Nominated Person:

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[54]Invention Title:

DEVICE FOR AUTOMATICALLY DOWNLOADING CONTROL SOFTWARE INTO A PORTABLE TELEPHONE

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[31,33,32]

Details of basic application(s):-

94 03784	FRANCE	FR	30 March 1994

Applicant states the following:

1. The nominated person is the assignee of Alcatel Radiotelephone who is the assignee of the actual inventors.

2. The nominated person is the assignee of the applicant of the basic application.

3. The basic application was the first made in a convention country in respect of the invention.

The nominated person is not an opponent or eligible person described in Section 33-36 of the Act.

28 March 1995

Societe Anonyme dite : Alcatel Mobile Communication France
By PHILLIPS ORMONDE & FITZPATRICK
Patent Attorneys
By

David B Fitzpatrick

Our Ref : 405974

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AUSTRALIA

Patents Act

COMPLETE SPECIFICATION
(ORIGINAL)

Class Int. Class

Application Number:
Lodged:

Complete Specification Lodged:
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Priority

Related Art:

Name of Applicant:

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Invention Title:

DEVICE FOR AUTOMATICALLY DOWNLOADING CONTROL SOFTWARE INTO A PORTABLE TELEPHONE

Our Ref : 405974
POF Code: 1501/230687

The following statement is a full description of this invention, including the best method of performing it known to applicant(s):

DEVICE FOR AUTOMATICALLY DOWNLOADING CONTROL SOFTWARE INTO A PORTABLE TELEPHONE

The present invention concerns updating the control software of a portable terminal and in particular a device for automatically downloading control software of a portable terminal such as a portable telephone.

In GSM type portable telephone systems the portable terminal or telephone of each user includes internal control software. This software is subject to updates and the mobile telephone user has to go to a central station or office to have the software of his device updated. Because this is a nuisance, many users do not bother to have their software updated.

For this reason, one object of the invention is to provide a device for automatically downloading control software of a portable terminal that users can use themselves without having to go to a central station or office.

Another object of the invention is to provide a method of downloading control software of a portable terminal in which the software is downloaded automatically after connecting the terminal to an automatic downloading device.

Accordingly, in one aspect, the present invention provides a device for automatically downloading control software of a portable data communication terminal including: a control unit, a modem connected between said control unit and a telephone line, said telephone line being adapted to be connected to a central station so that said control unit receives via said modem the latest version of said control software of said portable terminal, a reference memory connected to said control unit to store automatically the latest version of said control software, an interface for connecting said portable terminal and automatically downloading said latest version of said control software from said reference memory into a memory of said terminal.

In a second aspect, the present invention provides a method of automatically downloading control software of a portable data communication terminal using a device as described above and including the following steps executed under the control of said control unit of said automatic downloader device and after connection of said portable terminal to said interface of said automatic downloader device:

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- detecting that said portable terminal is connected to said interface,
- sending a request to said terminal requesting transmission of an identifier of the control software currently used by said portable terminal,
- after transmission of said control software identifier, comparison of the latter with a current identifier of said control software stored in said reference memory, and
- if said identifier of said control software currently used by said portable terminal is not said current identifier, transmitting the control software stored in said reference memory to said portable terminal for storage of said software in its internal memory.

In a further aspect, the present invention provides a method of automatically downloading control software of a portable data communication terminal using a device as described above connected to said central station via said telephone line and said modem, the method including the following steps:

- connecting said portable terminal to said interface of said automatic downloader device,
- detection by said control unit that said portable terminal is connected to said interface,
- sending a request via said control unit to said portable terminal to request transmission of said identifier of said control software currently used by said portable terminal,
- sending by said control unit of said identifier of said software used by said portable terminal to said central station via said modem and said telephone line,
- comparison by said central station of said identifier of said software currently used by said portable terminal and said current identifier of said software to be used.
- if said identifier of said software used by said portable terminal is not said current identifier of said software to be used, transmission by said central station of said control software to be used for simultaneous storage of said software in said buffer memory and transmission of said software to said portable terminal for storage in its internal memory, and

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storage by said control unit of said control software to be used in said reference memory by transfer from said buffer memory.

A preferred embodiment of the present invention will now be described with reference to the accompanying drawings wherein:-

Figure 1 is a block diagram of a device in accordance with the present invention for automatically downloading software;

Figure 2 is a flowchart showing the steps of the automatic software downloading method using the device shown in figure 1 when the downloader is not connected to the central station; and

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Figure 3 is a flowchart showing the steps of the automatic software downloading method of the invention when the downloader is connected to the central station.

The automatic downloading device 10 of the invention shown diagrammatically in figure 1 comprises a control unit 12 which can be of the microprocessor type with a screen 14 and a keyboard 16. The control unit 12 is connected to a random access memory (RAM) 18 by a bus 20 and to a reprogrammable non-volatile memory 22, preferably a "flash" type memory. The memory 22 which stores the updated control software is called the reference memory of the device.

The control unit 12 is connected by a data bus 24 to a modem 26 so that it can transmit and receive data via the telephone line connected to the telephone network.

The automatic downloading device 10 includes an interface 30 for connecting a portable terminal 32 such as a portable telephone. Connection of a portable terminal to the interface 30 is detected by the presence detector circuit 34 connected to the control unit in order to advise the latter of the presence of the portable terminal.

The control unit is connected to the interface 30 by means of a data transfer line 38 which is preferably a serial transfer line of the I2C type, for example.

Finally, the automatic downloading device 10 also includes a battery charger 36 for recharging the battery of the portable terminal each time that the latter is connected to the interface 30.

The method of automatically downloading control software into the portable terminal is shown in the figure 2 flowchart.

The first step (40) verifies that the terminal 32

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is connected to the interface 30. This is readily achieved by a ground loop or by a microswitch.

If the terminal is connected to the interface, the control unit 12 sends an identification request to the terminal (step 42) which responds by sending back the identifier of the control software used in the terminal.

As this point the control unit checks that the downloading device 10 has been connected to the telephone network via the modem 26 (step 44). If not, the control unit compares the identifier of the control software used in the terminal and the identifier of the updated software (step 46). If the comparison is positive the process is interrupted and returns to the start. Otherwise, the control software contained in the reference memory 20 is transferred to the portable terminal (step 48) over the data transfer line 38 to be stored in its memory (step 50). The process then loops to the start.

It is as well to specify at this point that billing for the control software can be based on the identifier number of the terminal or on the number of the downloader. The latter can apply if the downloader is supplied by the carrier (for example a telephone network operator). In either case, the carrier supplies various services via the central station (for example call forwarding), providing the user with a certain number of functions. If the user is interested in these, the carrier has two ways to provide supply functions other than the new version of the software, depending on the charger or terminal manufacturers:

- filtering at the level of the network part on the subscriber number (usually called "discrimination" in telephony), or

- filtering at the level of the terminal on service authorizations ("authorized services table" in GSM

terminology).

Accordingly, after step 44, and independently of the transmission of the software, the entitlement of the terminal to receive a certain number of functions is recognized (step 47). If the terminal is not entitled (the user has not subscribed to the corresponding services), the process loops to the start. On the other hand, if the terminal is entitled to receive these functions, then the functions are transmitted (step 49) from the memory of the downloader in which updated or new functions are stored upon connection of the downloader to the central station. The process ends with storage of these functions in the memory of the terminal (step 50).

Reverting to step 44, it is possible to connect the automatic downloader device to the telephone network before the portable terminal is connected to the interface of the device. In this case, the operator dials up the central station at which the latest version of the control software is available, usually in an appropriate database. Referring to figure 3 (step 52), the control unit transmits the identifier of the software used in the portable terminal to the central station. This identifier is compared to that of the latest version of the software stored in the station database (step 54).

If step 54 shows that the control software used in the terminal is the latest version held at the central station, the process ends and loops to the start. Otherwise, the central station transmits the updated control software to the downloader device 10 (step 56). When the control unit 12 receives the software from the central station it carries out two operations. It transmits the software to the terminal for storage in its own memory over the line 38 (step 58). However, it also stores the control software in its own buffer memory 18 (step 60). Then, after the new version of the control

software has been stored in the buffer memory 18, it is transferred from the buffer memory 18 to the reference memory 22 (step 62). This two-stage operation is needed because, if the software were instead loaded directly into the reference memory, any problems on the telephone line between the central station and the downloader device could cause errors in the software transmitted with the result that the downloader device would no longer hold any (error-free) version of the control software.

As previously, on identifying the terminal or the downloader or both, the central station verifies if the terminal is entitled to receive a certain number of functions (step 64), independently of updating of the control software. If not, the process loops to the start. If the terminal is entitled, said functions are transmitted from the central station (step 66). As previously the data is stored in the memory of the terminal (step 58) and also in the buffer memory of the downloader (step 60) before it is transferred into the reference memory of the downloader (step 62).

It is naturally possible to download the latest version of the control software and updated or new functions made available by the carrier (if the downloader or the terminals which can be connected to it are entitled to receive them) from the central station into the automatic downloader device 10. In this case, after connecting the device to the central station via the telephone network the latest version of the control software and the functions are transmitted from the central station to the downloader device and stored in the buffer memory 18, from which they are then transferred into the reference memory 22, in the same manner as previously (in steps 60 and 62).

It is possible for the downloader to be connected

to the telephone network at all times. In this case, simply connecting a terminal authorized for connection to the downloader enables acquisition of the updated version of the software or updated or new functions supplied by the carrier, without it being necessary to dial up the central station.

The claims defining the invention are as follows:

1. Device for automatically downloading control software of a portable data communication terminal including:

a control unit,

a modem connected between said control unit and a telephone line, said telephone line being adapted to be connected to a central station so that said control unit receives via said modem the latest version of said control software of said portable terminal.

a reference memory connected to said control unit to store automatically the latest version of said control software,

an interface for connecting said portable terminal and automatically downloading said latest version of said control software from said reference memory into a memory of said terminal.

2. Device according to claim 1 further comprising a buffer memory connected to said control unit and adapted to store said latest version of said control software received from said central station via said telephone line and said modem, said latest version of said software being automatically transferred into said reference memory from said buffer memory as soon as the latter has finished receiving said latest version of said control software.

3. Device according to claim 1 further comprising means for charging a power supply battery of said portable terminal which become operative when said portable terminal is connected to said interface of said device.

4. Device according to claim 1 wherein said portable terminal is a portable telephone.

5. Method of automatically downloading control software of a portable data communication terminal using

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a device according to any one of claims 1 to 4 and including the following steps executed under the control of said control unit of said automatic downloader device and after connection of said portable terminal to said interface of said automatic downloader device:

detecting that said portable terminal is connected to said interface,

sending a request to said terminal requesting transmission of an identifier of the control software currently used by said portable terminal,

after transmission of said control software identifier, comparison of the latter with a current identifier of said control software stored in said reference memory, and

if said identifier of said control software currently used by said portable terminal is not said current identifier, transmitting said control software stored in said reference memory to said portable terminal for storage of said software in its internal memory.

6. Automatic downloading method according to claim 5 further comprising the following steps after requesting said identifier of said control software:

verifying that said terminal is entitled to receive a certain number of functions that can be used by the user of said terminal, and

transmitting said functions if said terminal is entitled to receive them for storage in its internal memory.

7. Method of automatically downloading control software of a portable data communication terminal using a device in accordance with any one of claims 1 to 4 connected to said central station via said telephone line and said modem, said method including the following steps:

connecting said portable terminal to said interface

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of said automatic downloader device,

detection by said control unit that said portable terminal is connected to said interface.

sending a request via said control unit to said portable terminal to request transmission of said identifier of said control software currently used by said portable terminal,

sending by said control unit of said identifier of said software used by said portable terminal to said central station via said modem and said telephone line,

comparison by said central station of said identifier of said software currently used by said portable terminal and said current identifier of said software to be used,

if said identifier of said software used by said portable terminal is not said current identifier of said software to be used, transmission by said central station of said control software to be used for simultaneous storage of said software in said buffer memory and transmission of said software to said portable terminal for storage in its internal memory, and

storage by said control unit of said control software to be used in said reference memory by transfer from said buffer memory.

8. Automatic downloading method according to claim 7 further comprising the following steps after requesting said identifier of said control software:

verifying that said terminal is entitled to receive a certain number of functions that can be used by the user of said terminal,

transmission of said functions by said central station for simultaneous storage of said functions in said buffer memory and transmission thereof to said portable terminal for storage in its internal memory, and

storage by said control unit of said functions in

said reference memory by transfer from said buffer memory.

9. Device for automatically downloading control software of a portable data communication terminal substantially as herein described with reference to the accompanying drawings.

10. Method of automatically downloading control software of a portable data communication terminal substantially as herein described with reference to the accompanying drawings.

DATED: 15 September, 1998

PHILLIPS ORMONDE & FITZPATRICK
Attorneys for:
SOCIETE ANONYME DITE : ALCATEL MOBILE COMMUNICATION FRANCE

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ABSTRACT OF THE DISCLOSURE

A device for automatic downloading of the control software of a portable data communication terminal such as a portable telephone includes a control unit, a reference memory containing the latest version of the control software to be used by the terminal and an interface for connecting the portable terminal and automatically downloading the latest version of the control software into the memory of the portable terminal. The device also includes a modem enabling connection of the device to a central station and transmission by the latter of the latest version of the software for simultaneous storage of the software in the reference memory of the downloader device and in the internal memory of the portable terminal.

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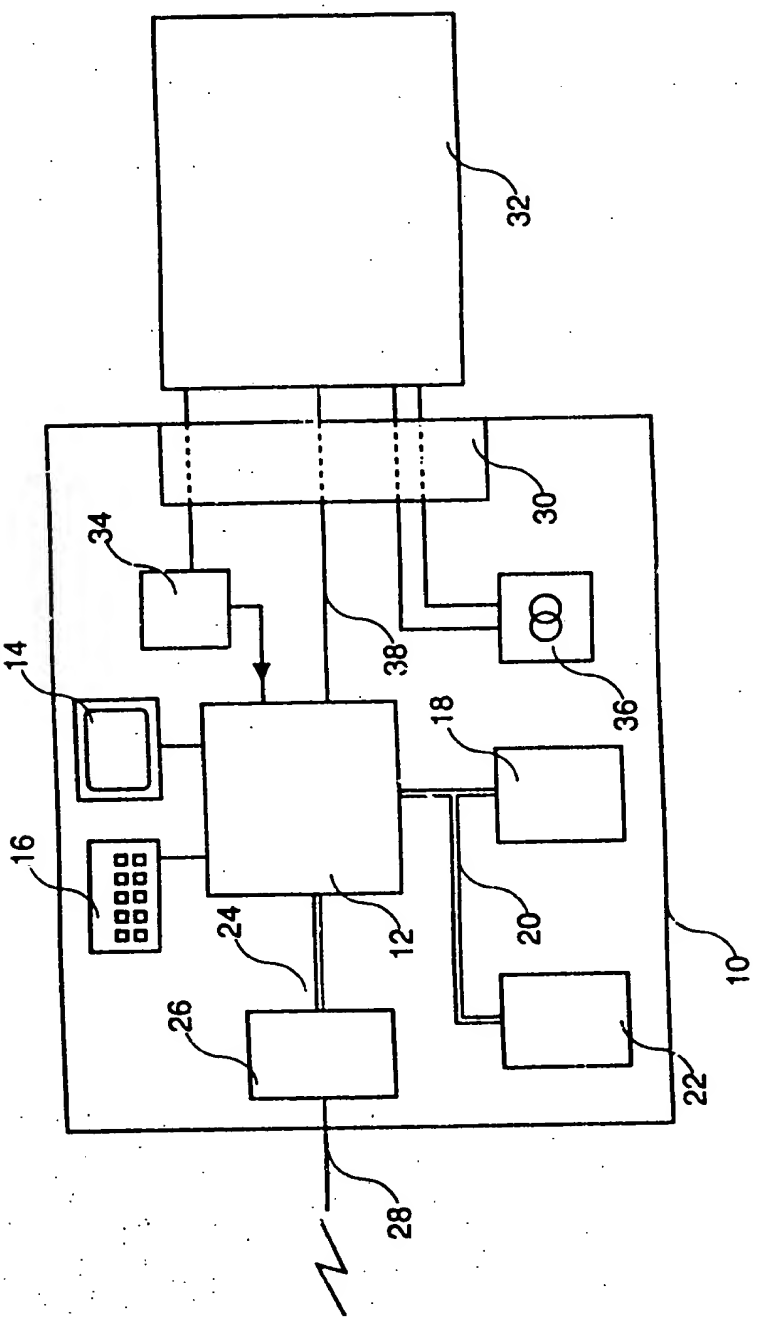

FIG. 1

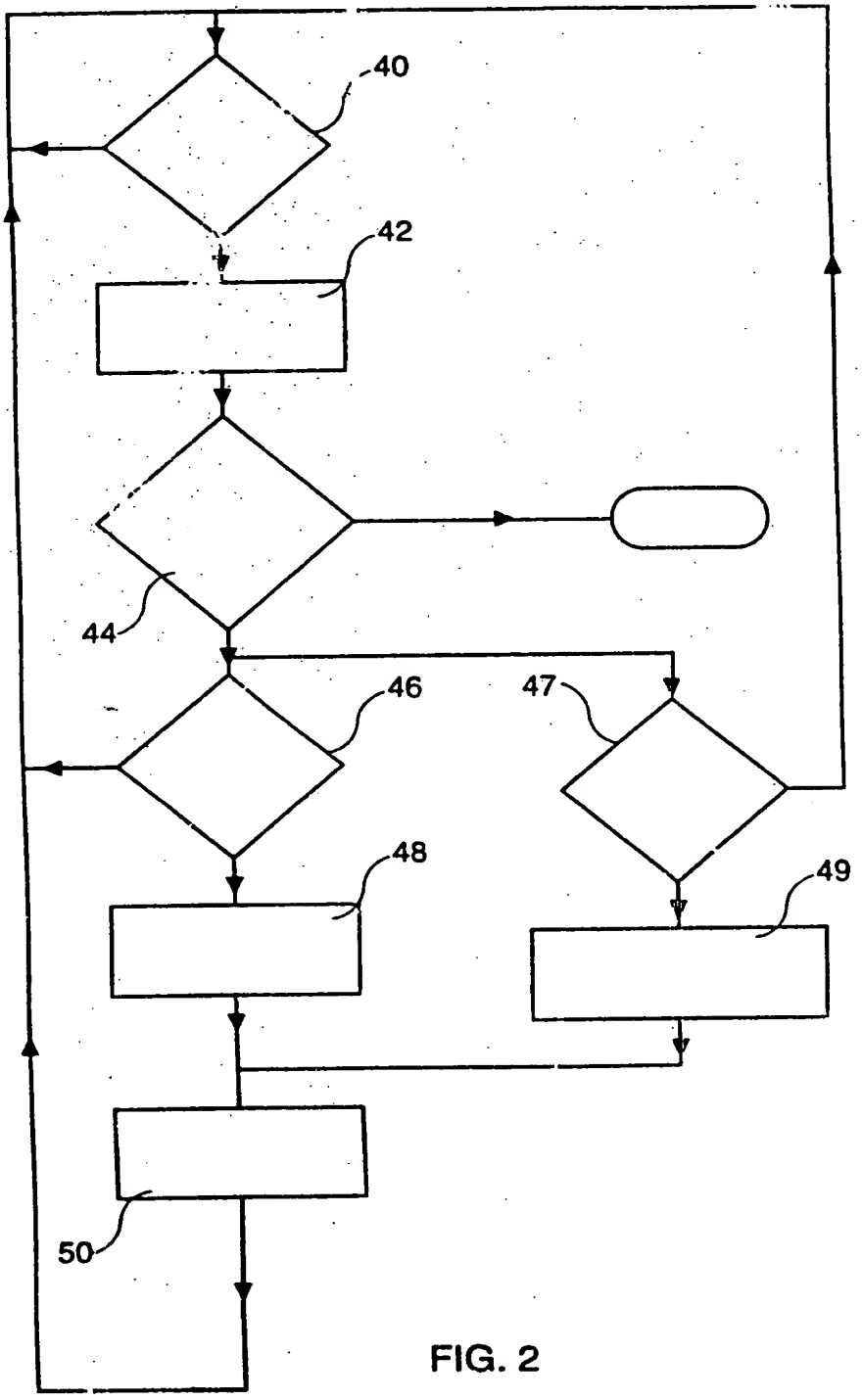

FIG. 2

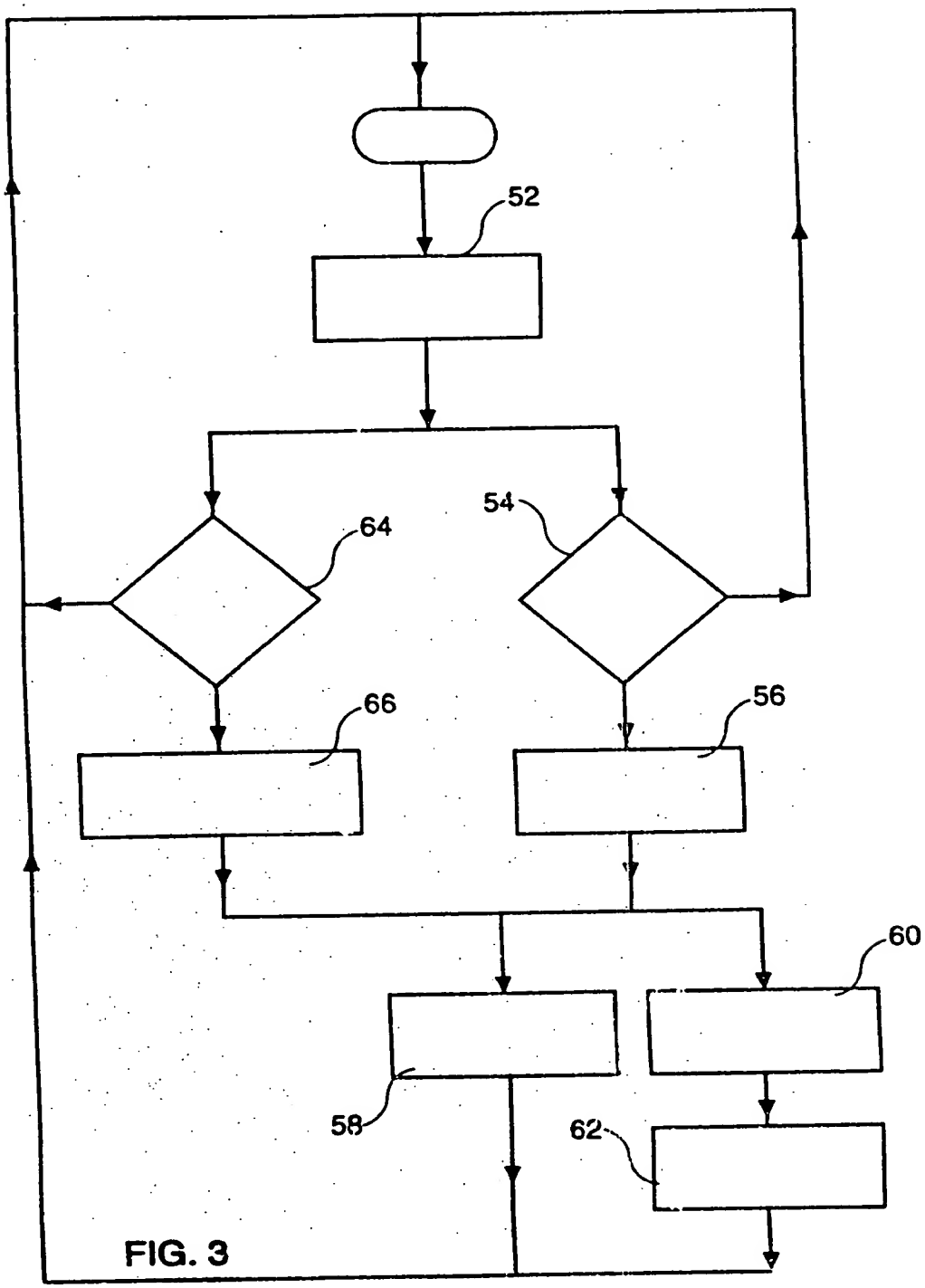

FIG. 3

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